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Filed : November 24, 2003

IN THE CLAIMS

Please amend Claims 1, 3-4, 8-9, 12-13, 17-19, 21-26, 30-35, 38, 41, and 43, cancel Claims 20 and 28-29 without prejudice, and add new Claim 46 as follows:

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1. (Currently amended) A method of operating client equipment in operative communication with a content-based network, said equipment comprising at least at least one hardware option and at least one application running on said equipment, the method comprising:
 - providing at least one application programming interface (API) adapted to interface with said at least one hardware option;
 - starting said at least one application;
 - discovering said at least one hardware option and said at least one API using said at least one application; and
 - selectively controlling said at least one hardware option using said at least one application via said API.
2. (Original) The method of Claim 1, wherein said act of providing at least one API comprises:
 - providing middleware having said API and a hardware registry; and
 - disposing at least one entry associated with said at least one hardware option within said registry.
3. (Currently amended) The method of Claim 2, wherein said act of discovering said at least one hardware option comprises accessing said hardware registry using a software function.
4. (Currently amended) The method of Claim 3, wherein said network comprises a multi-channel distribution network of the hybrid fiber coax (HFC) type, said equipment comprises a digital set-top box, and said act of selectively controlling said at least hardware option comprises providing digital video recorder (DVR) functionality.
5. (Original) The method of Claim 3, wherein said middleware is rendered in an object-oriented language, and said software function comprises a hardware registry interface object.

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6. (Original) The method of Claim 3, wherein said at least one entry comprises a plurality of entries relating to respective ones of said hardware options, and said act of accessing comprises iteratively searching said registry to discover each of said plurality of entries.

7. (Original) The method of Claim 6, wherein said plurality of entries relate to 5 different hardware options of the same general type, and said act of iteratively searching comprises using a name convention to selectively access individual ones of said different hardware options.

8. (Currently amended) A method of operating consumer premises equipment (CPE) within a content-based network, said CPE comprising a plurality of optional hardware 10 features, middleware adapted to communicate with said hardware features via a plurality of application programming interfaces (APIs), and a hardware registry having a plurality of entries associated therewith and relating to respective ones of said hardware options, the method comprising;

disposing an application onto said CPE; and
15 running said application to:

- (i) discover said hardware registry, said plurality of entries and said plurality of APIs; and
- (ii) access at least one of said hardware features via at least one of said plurality of APIs.

9. (Currently amended) The method of Claim 8, wherein said middleware 20 comprises a trusted application rendered in an object-oriented language, and said at least one of said hardware features is accessed by at least aet of making a plurality of calls comprises making calls to objects of said middleware adapted to particularly access said hardware registry.

10. (Original) The method of Claim 8, wherein said act of disposing comprises 25 providing retail CPE having said application already installed thereon.

11. (Original) The method of Claim 8, further comprising controlling, via said application, said at least one hardware feature.

12. (Currently amended) Third party consumer Consumer premises equipment (CPE) adapted for use within a content-based network, said CPE comprising:

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a plurality of proprietary and optional hardware features selected from the group consisting of: (i) digital video recorder (DVR) features, and (digital video interface (DVI) features;

a software application;

5 OpenCable (OCAP) compliant middleware adapted to communicate with said software application and said hardware features via a plurality of APIs; and

a hardware registry having a plurality of entries associated therewith and relating to respective ones of said hardware options features;

wherein said CPE is further adapted to:

10 run said application;

discover said hardware registry, said plurality of entries and said plurality of APIs;

access at least one of said proprietary and optional hardware features via at least one of said plurality of APIs; and

15 selectively control said at least one hardware feature using said application; and
wherein said third party CPE is configured to be utilized within a multiple systems operator (MSO) network and receive said software application via download from said network after installation of said CPE with a consumer premises.

13. (Currently amended) Apparatus adapted for operation within a cable network,
20 said apparatus comprising:

a processor;

a storage device operatively coupled to said processor;

first software running on said processor and adapted to control at least one function within said apparatus; and

25 at least one second software application adapted to run running on said processor;
wherein said first software is configured to:

- (a) maintain a registry of hardware options within said apparatus including storing data relating to said hardware options in said storage device; and
- (b) provide access to said hardware options to said at least one second software application via a plurality of software interfaces; and

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wherein said data relating to said hardware options comprises information regarding individual ones of said plurality of software interfaces which may be used to access individual ones of said hardware options.

14. (Original) The apparatus of Claim 13, further comprising a network interface 5 operatively coupled to said processor;

wherein said first software is further adapted to communicate with an external entity via said interface.

15. (Original) The apparatus of Claim 13, wherein said processor comprises an embedded processor, and said storage device comprises an embedded memory.

10 16. (Original) The apparatus of Claim 13, wherein said storage device comprises a hard disk drive (HDD).

17. (Currently amended) The apparatus of Claim 13, wherein said network comprises a multi-channel distribution network of the hybrid fiber coax (HFC) type, and said at least one hardware option comprises digital video recorder (DVR) functionality.

15 18. (Currently amended) The apparatus of Claim 17, wherein said DVR functionality further comprises personal video recorder (PVR) functionality.

19. (Currently amended) Fault-tolerant consumer premises equipment (CPE) adapted for coupling to a cable network, said CPE having a monitor application running thereon, said monitor application being adapted to (i) detect at least one event relating to the 20 operation of one or more software applications running thereon; (ii) selectively log data relating to said at least one event for subsequent use; (iii) enable at least one external network entity to control the operation of said CPE based at least in part on said at least one detected event; and (iv) provide a hardware registry accessible by said one or more applications whereby said one or more software applications can selectively access and control at least one optional hardware 25 feature of said CPE via a plurality of software interfaces.

20. (Cancelled)

21. (Currently amended) The CPE of Claim 20 19, wherein said at least one event comprises a resource depletion event, and said act of controlling the operation of said CPE comprises selectively suspending or destroying at least one of said one or more software 30 applications in order to mitigate said resource depletion.

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22. (Currently amended) A method of operating a cable network having a plurality of client devices operatively coupled thereto, the method comprising:

distributing at least one software application to each of said plurality of client devices;

5 providing at least one hardware registry within each of said client devices, said hardware registry containing data relating to a plurality of optional hardware associated with respective ones of said client devices;

providing at least one software interface within each of said client devices, said software interfaces being configured to interface between said at least one software application and at least one of said plurality of optional hardware;

10 running said at least one software application;

discovering said at least one hardware registry and said at least one software interface with said at least one software application, and

responsive to said discovering, controlling said at least one hardware option using said at least one software application and said at least one software interface.

15 23. (Currently amended) A head-end apparatus for use in a cable network, comprising at least one server having a software process running thereon, said software process being adapted to selectively download an application to at least one client device, said selective download of said application being based at least in part on information contained in a profile of said client device, said application being configured to detect and access records within a hardware registry disposed on said at least one client device, and control at least one hardware feature associated with said at least one client device via one or more software interfaces associated with the middleware of said at least one client device.

20 24. (Currently amended) The apparatus of Claim 23, wherein said application comprises a digital video recorder (DVR)-enabled Java-based application, and said at least one hardware feature comprises personal video recorder (PVR) functionality resident on said at least one client device.

25 25. (Currently amended) The apparatus of Claim 23, wherein said control of said at least one hardware feature is initiated by the middleware of said at least one client device.

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26. (Currently amended) Computer-readable media for use in a cable network, said media comprising a storage medium adapted to store a computer program thereon, said computer program adapted to run on a client device and to:

detect and access records within a hardware registry disposed on said client device, said records providing at least information regarding:

one or more parameters specific to at least one hardware feature associated with said client device; and

one or more application programming interface (API) that can be used to access and manipulate said at least one hardware feature; and

control said at least one hardware feature associated with said client device via said one or more software interfaces API associated with the middleware of said client device.

27. (Original) The computer-readable medium of Claim 26, wherein said storage medium comprises a hard disk drive (HDD).

28. – 29. (Cancelled)

30. (Currently amended) A method of conducting business via a cable network having a plurality of client devices operatively coupled thereto, said client devices each having at least one hardware registry containing data relating to a plurality of hardware features and software interfaces for utilizing the same, the method comprising:

distributing at least one software application to said plurality of client devices;

running said at least one software application on said plurality of client devices;

discovering said at least one hardware registry and said software interfaces with said software application; and

selectively accessing, via said registry, individual ones of said plurality of hardware features which are standardized; and

responsive to said discovering, controlling said selectively accessed individual ones at least one of said plurality of hardware features using said software application.

31. (Currently amended) The method of Claim 30, wherein said act of selectively distributing comprises:

distributing said software application to substantially all users of said plurality of client devices of said network; and

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selectively enabling only a subset of said users plurality of client devices to utilize said software application in conjunction with said at least one of said plurality of hardware features based on said at least one of a plurality of parameters.

5 32. (Currently amended) The method of Claim 31, wherein said act of selectively enabling comprises selectively embedding information within said software application before distribution thereof.

33. (Currently amended) The method of Claim 31, wherein said act of selectively enabling comprises configuring said software application such that it:

10 (i) accesses information relating to the individual one(s) of said plurality of client devices on which it is running; and
(ii) returns said information to a network agent, wherein said network agent accesses a database to determine if said utilizing should be enabled.

15 34. (Currently amended) Digital video recorder (DVR)-enabled consumer premises equipment (CPE) for use in a content-based network, wherein said DVR functionality is provided according to the method comprising:

providing at least one hardware registry within said CPE, said hardware registry containing data relating to DVR hardware associated therewith;

20 providing at least one software interface within said CPE, said software interface being configured to interface between at least one software application running on said CPE and said DVR hardware;

running said at least one software application;

discovering said at least one hardware registry and software interface using at least said software application, and

25 responsive to said discovering, controlling said DVR hardware using said software application and said at least one software interface;

wherein said act of controlling comprises implementing one or more user-specified rules provided to said application relating to the playback of content from said DVR hardware.

35. (Currently amended) The CPE of Claim 34, wherein said at least one software interface[[s]] comprises an application programming interface (API[[s]]).

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36. (Original) The CPE of Claim 34, wherein said at least one software interface is associated with OCAP-compliant middleware running on said CPE, and said application comprises a Java-based application adapted to make calls to objects within said middleware.

37. (Original) The CPE of Claim 36, wherein said registry comprises a database having 5 records each with a plurality of fields and each relating to a specific one of a plurality of hardware options, said plurality of hardware options including said DVR hardware.

38. (Currently amended) CPE for use in a content-based network, said CPE having an application-accessible hardware registry database comprising a plurality of records each with a plurality of fields relating to one or more of a plurality of hardware options features, said 10 hardware registry comprising a singleton made part of middleware resident on said CPE and being installed on said CPE after installation thereof in a consumer premises.

39. (Original) The CPE of Claim 38, wherein said fields comprise:

- (i) at least one field to identify the type or class of hardware;
- (ii) at least one field having parameters that are specific to the hardware; and
- 15 (iii) at least one field having a reference to software interface that can be used to access and manipulate the relevant one(s) of said hardware.

40. (Original) The CPE of Claim 39, said fields further comprising at least one field to uniquely differentiate hardware of the same type.

41. (Currently amended) A method of operating a consumer electronics device 20 having middleware and a hard drive in data communication with said middleware, comprising: providing an two or more applications adapted to run on said device and in conjunction with said middleware;

25 disposing a hardware registry having at least one DVR functionality record disposed therein, said at least one record further identifying at least one API for interface with said DVR functionality;

receiving contending requests for accessing said registry using at least said from said two or more applications; and

resolving said contending requests, thereby enabling one of said two or more applications to access said registry at a time; and

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controlling said DVR functionality via said at least one API so as to record at least a portion of content streamed to said device from an external source on said hard drive.

42. (Original) The method of Claim 41, wherein said act of accessing said registry comprises (i) discovering said registry; (ii) accessing said registry to identify said at least one 5 DVR record; and (iii) accessing said at least one DVR record to identify said at least one API.

43. (Currently amended) A In a cable network, a method of operating a ~~cable~~ network consumer premises device having middleware, a hardware registry having a DVR functionality record identifying an API for interface with said DVR functionality, and a hard drive in data communication with said middleware, the method comprising:

10 providing from said cable network a DVR-based application adapted to run on said device and in conjunction with said middleware;

accessing said registry using said application to identify said API; and

selectively controlling said DVR functionality via said API so as to store at least a portion of first entertainment content provided to said device on said hard drive for subsequent 15 use by a consumer;

wherein said consumer premises device comprises a device not associated with said cable network, and said act of controlling is performed substantially by said cable network-provided application.

44. (Original) The method of Claim 43, wherein said method further comprises 20 simultaneously:

storing a second at least portion of second entertainment content on said hard drive; and watching, via viewing apparatus operatively connected to said consumer premises device, third entertainment content.

45. (Original) A method of operating a cable network having an MSO and a plurality of 25 CPE coupled thereto, the method comprising:

configuring said CPE with one or more non-standardized hardware options; disposing entries relating to said one or more options within a hardware registry associated with said CPE, said entries having at least one standardized interface associated therewith; and

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operating an MSO application on said CPE, said MSO application accessing said one or more non-standardized options via said standardized interface.

46. (New) The method of Claim 41, wherein said act of resolving said contending requests comprises utilizing at least one of: a round-robin system, a priority based system,
5 and/or a collision detection and back-off system.